High Performance Computing Software

JPL Internal Seminar Series

Low-Thrust Orbit-Transfer Optimization with Parallel Evolutionary Computing

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Future space missions will depend more on low-thrust propulsions such as solar-electric propulsion thanks to its high specific impulse. The control of the low-thrust spacecraft poses a new challenging design problem. Third-body perturbations often dominate the thrust, and a significant change to the trajectory requires a long duration of thrust. In order to guide the early design phases, we have developed an efficacious and efficient method to obtain approximate propellant and flight-time requirements (i.e., the Pareto front) for orbit transfers using evolutionary algorithms. In this talk, we will present the developed method for orbit transfer optimization and recent results for orbit transfers around the Earth and those around the Europa with Jupiter gravity influence. This work is supported by JPL's R&TD program under the strategic initiative High Capability Computing in Engineering and Science.

For questions, please contact Dan Katz at 4-7359